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# Status Epilepticus in Our Patients, a 15 Years Follow-Up Study

## ABSTRACT

**Introduction:** Status epilepticus (SE) is the second most frequent neurological emergency. The purpose of this study was to analyse clinical presentation, causes and outcome of SE.

**Aim of the Study:** The aim was to establish clinical characteristics, etiology and the outcome of status epilepticus as well as sex and age distribution in patients hospitalized at the Clinic of Neurology UCC RS in a 15-year follow-up.

**Patients and Methods:** In this prospective 15-year study, all patients with SE admitted to the University Clinical Center of Republic of Srpska, Clinic of Neurology, were treated in the period of 15 years (2003-2017). Demographic and clinical data were collected.

**Results:** In the aforesaid period, 124 patients with SE were treated, and there were 71 man (57%) with mean age of 59 years and 54 woman (43%), with mean age of 52.5 years. Primarily generalized tonic-clonic SE was identified in 70 (56%) and 44 (35.2%) patients, retrospectively. Simple partial SE occurred in 10 (8%) patients. 62% of the patients had previously had epilepsy while 38% had not. The main underlying causes were noncompliance to treatment in the first group (n=56; 72%) and cerebrovascular disease (n=36; 75%) in the second group. Overall mortality rate was 11.2% , which correlated with acute symptomatic etiology and patients of older age (mean: 73 years).

**Conclusion:** Epileptic patients are at greater risk to develop SE. However, in patients with no prior history of epilepsy and acute neurological problems SE may also occur. Cerebrovascular disease was the most common cause of SE in those with the initial seizure. Noncompliance to treatment was the major cause in patients with preexisting epilepsy.

**Key words:** epilepsy, status, etiology, clinical presentation, outcome

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## Introduction

It is usual for status epilepticus not to last long and to have a tendency to spontaneously terminate. It is very rare for individual seizures to last longer than few minutes. However, in some cases, seizures do not terminate spontaneously and their tendency to continue presents the essence of status epilepticus. Status epilepticus is the most urgent neurological state and reliability of diagnosis depends on the way the problem is defined.<sup>1,2</sup>

Overall definition indicates that status epilepticus should be defined as an epileptic activity that is present for 30 minutes or longer as well as the presence of two or more seizures during which the patient does not return to baseline consciousness.<sup>2,3</sup> Contemporary papers tend to put under status epilepticus every expressed tendency to repeat epileptic seizures, regardless of their duration and without the full recover of consciousness or other functions affected by the seizure.

Basis for this perception is empirical and is based on the knowledge that epileptic seizures typically last shorter than few minutes. In greater number of patients, secondary generalized tonic-clonic seizure will last between one and two minutes. Unlike that, most seizures that last longer than 5 minutes will last even longer than 30 minutes if not terminated with the use of medication.<sup>3,4</sup>

Status epilepticus is a medical and neurological emergency that has been associated with significant morbidity and mortality. SE is a major clinical concern in the adults and specially in the elderly population, both because it has increased incidence in the elderly compared with general population, and because of concurrent medical conditions that are more likely to complicate therapy and worsen prognosis in elderly individuals.<sup>4,5</sup>

Many types of epileptic seizures have been described, and, therefore, it follows that there are many types of status epilepticus. This has led to complex classification of status epilepticus. However, using electroclinical features, status epilepticus may be classified simply by the presence of motor convulsions (convulsive status epilepticus) or their absence (nonconvulsive status epilepticus). They may be further divided into status epilepticus that affects the whole brain (generalized status epilepticus) or only part of the brain (partial status epilepticus). Status epilepticus may be initial (first epileptic manifestation) and intercurrent (in patients with prior history of epilepsy).<sup>5</sup>

## Aim of the Study

The aim was to establish clinical characteristics, etiology and the outcome of status epilepticus as well as sex and

age distribution in patients hospitalized at the Clinic of Neurology UCC RS in a 15-year follow-up.

## Patients and Methods

In this prospective 15-year study, all patients with SE admitted to the University Clinical Center of Republic of Srpska, Clinic of Neurology, were treated in the period of 15 years (2003-2017).

We also analyzed demographic data (age, sex), status epilepticus types (generalized tonic-clonic; absences, partial, nonconvulsive, initial or intercurrent), outcome of status epilepticus (survived or not), and after the diagnostic procedures, we analyzed etiology of status epilepticus.

## Results

In the fifteen-years period from 2003-2017, we had total of 125 patients with status epilepticus, 71 (57%) of them were male, and 54 (43%) were female.

Mean age of males was 59 years (with the range from 22 to 93 years), while the mean age of females was 52,5 years (with the range from 17 to 93 years).

14 patients died in that period, overall mortality was 11,2%. Deaths were correlated with acute symptomatic etiology due to cerebrovascular disease, and the mean age of those patients was 73 years.

Most of the patients had primarily generalized tonic-clonic status epilepticus (n=70; 56%), while the focal onset with secondarily generalized status epilepticus had 44 (35.2%) patients. Simple partial status epilepticus occurred in 10 (8%) patients, and one patient had nonconvulsive status epilepticus (0.8%). An absence of status epilepticus was not registered in our study.

Status epilepticus occurred in 77 (62%) patients with preexisting epilepsy, and in this subgroup of patients, noncompliance to treatment was the major cause in 56 (72%) patients with intercurrent SE.

Status epilepticus occurred in 48 (38%) patients as the first manifestation of disease, and cerebrovascular disease was the main cause in 36 (75%) patients. Etiology of status epilepticus is shown in Table 1.

The most common single cause of status epilepticus in whole group of patients was noncompliance to treatment in patients with preexisting epilepsy in 44.8% patients, followed by cerebrovascular disease in 28.8% patients. The third most common cause of status epilepticus was brain tumors and metastases in 5.6% patients..

**Table 1. Etiology of status epilepticus**

Etiology	n (%)
Noncompliance to treatment	56 (44.8)
Cerebrovascular disease	36 (28.8)
Tumors/metastases of brain	7 (5.6)
Alcohol intake	5 (4)
CNS infections	5 (4)
Infections with fever	5 (4)
Sequelae of brain injuries	3 (2.4)
Farmacoresistant epilepsy	3 (2.4)
Brain injuries	2 (1.6)
Metabolic causes	2 (1.6)
Idiopathic/criptogenic etiology	1 (0.8)
SUM:	125 (100)

There is a list of causes with incidence of 4% (alcohol intake, central nervous system infections, febrile systemic infections), followed by causes with the incidence of 2.4% (sequelae of brain injuries and patients with farmacoresistant epilepsy).

As a rare causes of status epilepticus we identified brain injuries and metabolic causes (renal and hepatic encephalopathy) in two patients, and in one patient the etiology remained idiopathic/criptogenic.

## Discussion

According to International classification of epilepsy and epileptic syndromes the basic level of recognition of epilepsy and status epilepticus is regarding the etiology. So, we recognise symptomatic, idiopathic and criptogenic status epilepticus. Symptomatic etiologies could be acute or chronic. Idiopathic or criptogenic status epilepticus could have better prognosis than symptomatic ones.<sup>7</sup> Criteria for classification depend on anamnesis, undertaken diagnostic procedures, observation and length of follow-up of the patients. Acute symptomatic etiologies correlated with poor outcome.<sup>4</sup> To underline the importance of acute symptomatic etiologies, some authors divide all etiologies on acute symptomatic in one hand and all others in another hand.<sup>8</sup>

In our study, the incidence of status epilepticus was

higher for men compared with women (57% vs. 43%). The male patients were older compared with females (59 years vs. 52.5 years). Knake et al.<sup>9</sup> and Delanty et al.<sup>11</sup> reported in their studies a higher incidence of status epilepticus in men too. Božić et al.<sup>12</sup> reported in their study that status epilepticus occurred more often in male patients, and cerebrovascular disease was definitely the predominant cause.

Most of the previous studies suggest acute symptomatic etiology of status epilepticus.<sup>4</sup> Hui et al.<sup>7</sup> reported that the most common underlying causes of status epilepticus were cerebrovascular disease, metabolic derangement, anti-convulsant withdrawal and alcohol intake.

Among the patients with status epilepticus as a first epileptic manifestation almost all studies found cerebrovascular disease as a leading underlying cause (Vignatelli et al.<sup>11</sup> 30%; Afsar et al.<sup>13</sup> 24.8%; Knake et al.<sup>9</sup> 33%; Darcel et al.<sup>14</sup> 37%; Delanty et al.<sup>1</sup> 41%; Govoni et al.<sup>8</sup> 45%) which correspondents with our results. Amare et al.<sup>15</sup> showed in their study with 119 Ethiopian patients that central nervous system infection was the most common cause of status epilepticus in the whole group, as well as in those with new onset seizure. We had 4% of patients with central nervous system infections in our study.

In previous studies, the proportion of patients with preexisting epilepsy was from 46% to 60%<sup>1,9,10,11</sup> and noncompliance to treatment was the major cause for status epilepticus in this group of patients, which correspondents with our results. Di Bonaventura et al.<sup>2</sup> reported that the predominant cause for status epilepticus were noncompliance, withdrawal or reduction of antiepileptic drugs.

In all previous studies, older age and underlying etiology were predictors of mortality. Reported mortalities in previous studies were from 1.9% to 40%.<sup>16</sup> Mortality in our study was 11.2% which is lower than reported in previous studies despite the similar clinical features of the patients (20.2%<sup>15</sup>; 15.6%<sup>17</sup>; 16%<sup>7</sup>; 19.8%<sup>10</sup>), and is very similarly reported in studies of Wu et al.<sup>6</sup> (10.7%), Govoni et al.<sup>8</sup> (5%), Vignatelli et al.<sup>11</sup> (7%), and Chin et al.<sup>4</sup> (7.6%). Hui et al.<sup>7</sup> reported older age, delay in treatment and status epilepticus due to cerebrovascular disease as a predictors of poor outcome. Our deceased patients had a mean age of 73 years and status epilepticus due to cerebrovascular disease.

Renal or hepatic encephalopathy are reported in literature as individual causes of status epilepticus.<sup>18,19</sup>

## Conclusion

Epileptic patients are at greater risk to develop SE. However, in patients with no prior history of epilepsy and acute neurological problems SE may also occur. Cerebrovascular disease was the most common cause of SE in those with the initial seizure. Noncompliance to treatment was the major cause in patients with preexisting epilepsy, which offers a good possibility for prevention. This study confirms the higher incidence of status epilepticus in male patients and in the elderly population. This may be due to a higher incidence of cerebrovascular disease in these subpopulations. Older age and acute symptomatic etiology were the major determinants of death.

## References

- Delanty N, French JA, Labar DR et al. Status epilepticus arising de novo in hospitalized patients: an analysis of 41 patients. *Seizure* 2001; 10(2):116-9. [https://doi.org/10.1016/S1059-1311\(00\)90482-5](https://doi.org/10.1016/S1059-1311(00)90482-5) <https://doi.org/10.1053/seiz.2000.0482> PMID:11407954
- Di Bonaventura C, Mari F, Vanacore n et al. Status epilepticus in epileptic patients. Related syndromes, precipitating factors, treatment and outcome in a video-EEG population based study. *Seizure* 2008; 17(6):535-48. <https://doi.org/10.1016/j.seizure.2008.02.002> PMID:18400524
- Waterhouse JE, De Lorenzo JR. Status epilepticus in older patients. *Drugs Aging* 2001; 18(2):133-142. <https://doi.org/10.2165/00002512-200118020-00006>
- Chin RF, Neville BG, Scott RC. A systematic review of the epidemiology of status epilepticus. *Eur J Neurol* 2004; 11(12):800-10. <https://doi.org/10.1111/j.1468-1331.2004.00943.x> PMID:15667410
- Marik EP, Varon J. The management of status epilepticus. *CHEST* 2004; 126:582-591. <https://doi.org/10.1378/chest.126.2.582> PMID:15302747
- Wu YW, Shek DW, Garcia PA et al. Incidence and mortality of generalized convulsive status epilepticus in California. *Neurology* 2002; 58(7):1070-6. <https://doi.org/10.1212/WNL.58.7.1070>
- Hui AC, Joynt GM, Li H, Wong KS. Status epilepticus: aetiology, outcome and predictors of death and morbidity. *Seizure* 2003; 12(7):478-82. [https://doi.org/10.1016/S1059-1311\(03\)00024-4](https://doi.org/10.1016/S1059-1311(03)00024-4)
- Govoni V, Fallica E, Monetti VC et al. Incidence of status epilepticus in southern Europe: a population study in the health district of Ferrara, Italy. *Eur Neurol* 2008; 59(3-4):120-6. <https://doi.org/10.1159/000111873> PMID:18057897
- Knake S, Rosenow F, Vescovi M et al. Incidence of status epilepticus in adults in Germanu: a prospective, population based study. *Epilepsia* 2001; 42(6):714-8. <https://doi.org/10.1046/j.1528-1157.2001.01101.x> PMID:11422324
- Garzon E, Fernandes RM, Sakamoto AC. Analysis of clinical characteristics and risk factors for mortality in human status epilepticus. *Seizure* 2003; 12(6):337-45. [https://doi.org/10.1016/S1059-1311\(02\)00324-2](https://doi.org/10.1016/S1059-1311(02)00324-2)
- Vignatelli L, Rinaldi R, Galeotti M et al. Epidemiology of status epilepticus in a rural area of northern Italy: a 2-year populatin based study. *Eur J Neurol* 2005; 12(11):897-902. <https://doi.org/10.1111/j.1468-1331.2005.01073.x> PMID:16241980
- Božić K, Žikić M, Mišić-Pavkov G. et al. Occurrence, causes and clinical characteristics of status epilepticus in adults. *Med Pregl* 1998; 51(5-6):254-8. PMID:9720354
- Afsar N, Kaya D, Atkan s et al. Stroke and sttus epilepticus: stroke type, type of status epilepticus, and prognosis. *Seizure* 2003; 12(1):23-7. <https://doi.org/10.1016/S1059131102001437> PMID:12495645
- Darcel G, Verstichel P, Herbaund S et al. Status epilepticus in elderly patients. A retrospective study of 63 in-patients. *Rev Neurol* 2008, 164(11):935-42. <https://doi.org/10.1016/j.neurol.2008.04.007> PMID:18808782
- Amare A, Zenebe G, hammack J, Davey G. Status epilepticus: clinical presentatio, cause, outcome and predictors of death in 119 Ethiopian patients. *Epilepsia* 2008; 49(8):600-7.
- Rosenow F, Hamer HM, Knake S. The epidemiology of convulsive and neconvulsive status epilepticus. *Epilepsia* 2007; 48(suppl 8):82-4. <https://doi.org/10.1111/j.1528-1167.2007.01359.x> PMID:18330009
- Rossetti AO, Hurwitz S, Logroscino G, Bromfield EB. Prognosis of status epilepticus: role of aetiology, age and consciousness impairment at presentation. *J neurol neurosur Psychiatry* 2006; 77(5):611-5. <https://doi.org/10.1136/jnnp.2005.080887> PMID:16614020 PMID:PMC2117456
- Rodriguez U, Franco ME, Delgado Lf. Epileptic status in chronic renal failure. *Med Clin* 2004; 123(10):399.
- Tanaka H, Ueda H, Kida Y et al. Hepatic encephalopathy with status epilepticus: a case report. *World J Gastroenterol* 2006; 12(11):1793-4. <https://doi.org/10.3748/wjg.v12.i11.1793> PMID:16586556 PMID:PMC4124362

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# Epileptički status kod naših pacijenata, petnaest godina iskustva

## SAŽETAK

**Uvod:** Epileptički status (SE) je drugo po učestalosti urgentno stanje u neurologiji. Cilj studije je analiza kliničkih manifestacija, uzroka i ishoda SE.

**Cilj rada:** Cilj rada je da se utvrde kliničke karakteristike, etiologija i ishod epileptičkog statusa kao i polna i starosna distribucija kod bolesnika hospitalizovanih na Klinici za neurologiju UKC RS u petnaestogodišnjem periodu praćenja.

**Ispitanici i metode:** Prospektivno su praćeni svi bolesnici koji su liječeni na Klinici za neurologiju Univerzitetskog kliničkog centra Republike Srpske pod dijagnozom epileptičkog statusa u periodu od 15 godina (2003-2017. godina). Prospektivno su praćeni demografski i klinički parametri.

**Rezultati:** U posmatranom periodu ukupno je liječeno 125 bolesnika zbog SE, od toga 71 (57%) muškaraca, prosječne starosti 59 godina, kao i 54 (43%) žene prosječne starosti 52,5 godina. Primarno generalizovani toničko klonički SE je imalo 70 (56%), dok su parcijalni SE sa sekundarnom generalizacijom imala 44 (35,2%) bolesnika, a 10 bolesnika (8%) je imalo prosti parcijalni SE. 62% bolesnika je prethodno bolovalo od epilepsije dok 38% nije. Najčešći uzrok SE u prvoj grupi je bilo neuzimanje lijekova (n=56; 72%), a cerebrovaskularna bolest u drugoj grupi (n=36; 75%). Ukupna smrtnost je bila 11,2%, što je bilo povezano sa akutnim simptomatskim uzrokom i starijim životnim dobom bolesnika (prosječna starost 73 godine).

**Zaključak:** Bolesnici sa epilepsijom su u višem riziku za dobijanje SE, ali i bolesnici bez prethodne epilepsije i akutnim neurološkim bolestima takođe mogu razviti SE. Cerebrovaskularne bolesti su bile najčešći uzrok SE kod bolesnika sa inicijalnim SE. Neuzimanje antiepileptičkih lijekova je bio najčešći uzrok SE kod bolesnika sa epilepsijom.

**Ključne riječi:** epilepsija, status, etiologija, kliničke manifestacije, ishod